

## A New Cleptoparasitic *Lasioglossum* (Hymenoptera, Halictidae) from Africa

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**Abstract.**—*Lasioglossum (Dialictus) ereptor* Gibbs, new species, is described and illustrated. The sole known specimen, a female, is from Mount Kilimanjaro, Tanzania. The species has several characteristics typical of cleptoparasitic and socially parasitic Halictidae. A brief summary of the independent cleptoparasitic lineages of *Lasioglossum* is given.

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Cleptoparasitism and social parasitism (for simplicity called ‘parasitism’ hereafter) have arisen multiple times among halictid bees (reviewed in Michener 1978; see also Pauly 1984, 1997; Engel et al. 1997; Biani and Wcislo 2007). The widespread genus *Lasioglossum* Curtis *sensu lato* displays a wide range of behavioural systems (reviewed in Michener 1974, 1990; Packer 1993, Yanega 1997) including multiple parasitic lineages (Table 1; Michener 1978, 2007). Parasitic *Lasioglossum* are known only from eastern North America (*Paralictus* Robertson=*Dialictus* Robertson), central Africa (*Paradialictus* Pauly) and Samoa (*Echthralictus* Perkins and Cheesman) (Michener 2007). Each lineage is believed to be a recent derivative of its non-parasitic host taxon (Michener 1978; Pauly 1984). Halictine host species may be solitary or have eusocial societies (e.g. Packer 1990; Eickwort et al. 1996) which might invalidate the distinction between cleptoparasitism and social parasitism for some parasitic halictines (Biani and Wcislo 2007). A new African species of parasitic *Lasioglossum* believed to be a derivative of the subgenus *Dialictus* (sensu Michener 2007) is described.

### METHODS

The descriptive format and abbreviations follow that of Gibbs and Packer

(2006). Terminology follows that of Michener (2007), Engel (2001) and Harris (1979). The diameter of the median ocellus (OD) is used as a relative measure of hair length. Puncture density is given in relation to interspace size (i) and puncture diameter (d). Flagellomeres and metasomal terga and sterna are abbreviated F, T and S, respectively, followed by the appropriate number.

### RESULTS

#### *Lasioglossum (Dialictus) ereptor* Gibbs, new species Figs 1–3.

**Diagnosis.**—Female. Slender halictine with deep blue metallic reflections on the head and mesosoma; metasoma pale orange; distal wing veins (1rs-m, 2rs-m, 2m-cu) weak; scopa absent, vestiture extremely sparse and entirely pale; mandibles not reaching opposing mandibular base, subapical tooth present; labrum with medial tubercle and apical process; macrosculpture and punctuation largely absent.

**Differential Diagnosis.**—Females of *L. ereptor* can be distinguished from other African *Dialictus* (= *Afrodialictus* Pauly) by the absence of scopal hairs and reduced penicillus, basitibial plate and median longitudinal specialized area of T5. Fe-

Table 1. Summary of cleptoparasitic or socially parasitic taxa in the halictine bee genus *Lasioglossum*.

Subgenus	Author	Species	Author	Country	Distribution	Host
<i>Paralictus</i> = <i>Dialictus</i> <sup>1</sup>	Robertson 1901: 229	<i>cephalotes</i> <i>platyparium</i>	Dalle Torre 1896: 57 Robertson 1895: 117	Canada, USA	ON to NC, west to MN ON to GA, west to LA and MN	? <i>L. (D.) zephyrum</i> <sup>3</sup> ? <i>Dialictus</i>
		<i>michiganense</i> <i>simplex</i> <i>asteris</i> <sup>2</sup>	Mitchell 1960: 448 Robertson 1901: 230 Mitchell 1960: 447	USA	ON to NC	<i>Dialictus</i>
<i>Dialictus</i> <sup>1</sup>	Robertson 1902: 48	<i>ereptor</i>	Gibbs 2008: 74	Canada, USA	MA to NC, west to KS ON to AL, west to KS	<i>L. (D.) versatum</i> <sup>4</sup> <i>L. (D.) imitatum</i> <sup>4</sup>
<i>Echthralictus</i>	Perkins and Cheesman 1928: 14	<i>extraordinarium</i>	Kohl 1908: 306	Tanzania	Mt. Kilimanjaro	? <i>Afrodialictus</i> = <i>Dialictus</i>
<i>Paradialictus</i>	Pauly 1984: 691	<i>latro</i> <i>synavei</i>	Perkins & Cheesman 1928: 23 Pauly 1984: 691	Samoa DR Congo (Zaire)	Samoa Virungas N. P.	? <i>Homalictus</i> ? <i>Afrodialictus</i> = <i>Dialictus</i>

<sup>1</sup> *Dialictus* also contains hundreds of non-parasitic species.

<sup>2</sup> *L. (D.) asteris* may belong to a distinct lineage from other "*Paralictus*" (Gibbs, in prep.)

<sup>3</sup> Parasite collected at nesting site of putative host species which is eusocial.

<sup>4</sup> Parasite collected inside nest of eusocial host species.

males of *L. ereptor* may be distinguished from the parasitic species *L. (Paradialictus) synavei* Pauly by the metallic colouration and pale abdomen of the former, and the black colouration, enlarged head, elongate mandibles with deep preapical incision and lunate propodeal flange of the latter.

*Description.*—*Female*. Body length: 5.0 mm. Head width: 1.3 mm. Head length: 1.2 mm. Fore wing length: 3.5 mm. Inter-tergular distance: 0.9 mm. OD: 0.01 mm.

**Colouration:** Head and thorax deep metallic blue. Labrum, distal margin of clypeus, basal half of mandible brown, remainder of mandible testaceous, apex red; scape and pedicel dark brown; flagellomeres brown, faintly ferruginous; post-gena faintly metallic. Tegula dark brown, infused with ferruginous; wing venation brown, pterostigma and distal veins testaceous; wing dusky throughout; legs brown, tarsi infused with testaceous. Propodeum faintly metallic with purplish tinge. Metasoma pale orange.

**Pubescence:** Sparse and pale throughout. Basal area of labrum with apicolateral bristles; mandibles and distal margin of clypeus with sparse fringe of stiff bristles ( $\geq 3OD$ ). Pronotal lobe posterior margin with dense tomentum; remainder of mesosoma with sparse, erect hairs (2OD), longest along posterior margin of mesoscutellum (3OD); mid femoral and tibial combs present but weak; scopa absent; penicillus reduced; wing setae evenly distributed, brown; erect hairs on posterior surface of propodeum with slightly longer branches than other hairs. Terga with sparse, erect hairs on ventrally reflexed portions and premarginal line, more numerous on T4–T5 dorsal surface (2–3OD), fine setae visible on dorsal surface from certain angles; sterna posterior portions with sparse, faintly sinuate, branched hairs, oriented posteriorly (3–4OD).

**Surface sculpture:** Microsculpture weak throughout. Clypeus and supraclypeal area faintly imbricate, shining, with few more or less uniformly spaced punctures

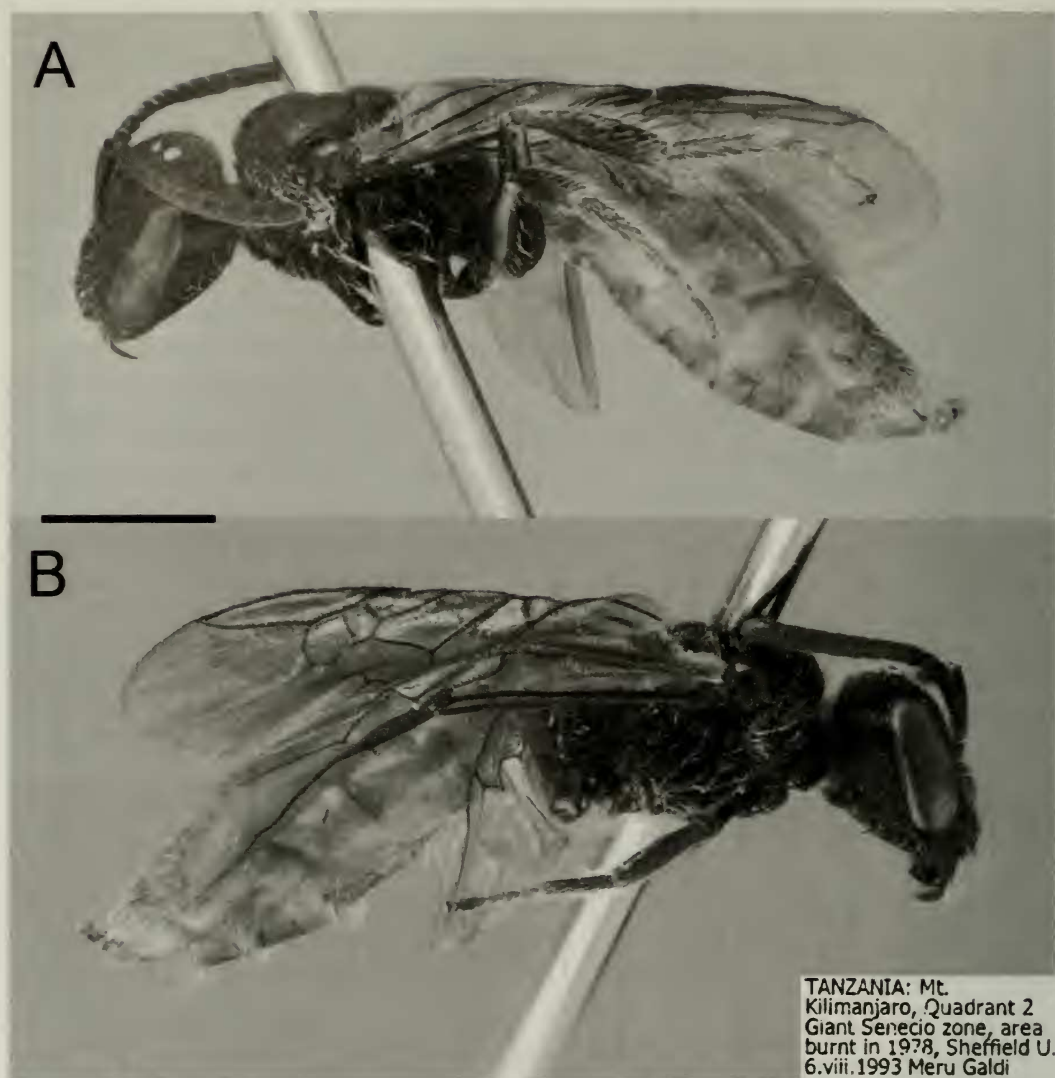


Fig. 1. Lateral habitus of *Lasioglossum ereptor*, n. sp. A) left side B) right side. Scale bar equals 0.5 mm. Inset: Holotype locality label.

( $i=1-2d$ ), paraclypeal, parasupraclypeal, and upper paraocular areas more densely punctate ( $i=d$ ), remainder of face faintly punctate and closely scabriculous; genal area weakly strigate. Mesoscutum and mesoscutellum faintly imbricate, shining, punctures sparse ( $i=2-4d$ ) and fine, posterior margins of mesoscutum and depressed medial area of mesoscutellum with dense punctation ( $i \leq d$ ); mesepisternum faintly scabriculous, tessellate below, hypoepimeral area imbricate. Propodeum tessellate, faint lon-

gitudinal striae on basal portion of dorsal surface. Metasoma smooth, sculpture very obscure, surface weakly coriarius, terga with sparse ( $i=2-5d$ ), very fine punctures on disc; sterna with piliferous punctures posteriorly.

**Structure:** Head slightly broader than long (1.3 : 1.2); inner orbits nearly parallel (slightly closer below at level of clypeus). Labrum short and broad with basal elevation, distal process present, over half length of remainder of labrum; mandible





Fig. 2. Frontal view of head of *Lasioglossum ereptor*, n. sp. Scale bar equals 0.5 mm.

somewhat enlarged, not reaching opposing mandible base, preapical tooth present. Clypeus broader than long (2.5 : 1.0); clypeal length greater than distance from upper margin of clypeus to lower margin of antennal socket; subantennal sutures faint; supraclypeal area convex, more protuberant than rest of face; median ocellus above upper ocular tangent; distance between orbit and lateral ocellus nearly double distance between lateral ocelli (1.7 : 1.0). Hypostomal carinae subparallel; genal area slightly wider than eye in lateral view, preoccipital carina absent. Antenna rather long, nearly reaching mesoscutellum; scape over 6 times as long as maximum width; pedicel about 1.5 times as long as broad, longer than F1; flagellomeres slightly longer than broad, succeeding flagellomeres each slightly longer and broader than preceding one. Dorsolateral angles of pronotum obtuse; mesoscutum convex with declivous anterior and lateral margins; mesoscutellum with median longitudinal depression; tegula narrow ovoid; 2<sup>nd</sup> and 3<sup>rd</sup> transverse



Fig. 3. Dorsal view of mesosoma of *Lasioglossum ereptor*, n. sp. Scale bar equals 0.5 mm.

cubital (1rs-m and 2rs-m) and 2<sup>nd</sup> recurrent (2m-cu) veins and 3<sup>rd</sup> abscissa of vein M weakened; marginal cell with apex pointed on wing margin, pterostigma more than 4 times as long as broad; basitibial plate small, not enclosed by carinae; hind tibial spur pectinate with 4 teeth (not including apex of rachis); metapostnotum long and wide, constituting majority of dorsal propodeal surface, declivous portions of basal area small, rounded onto lateral surface; lateral carina short, reaching less than halfway to dorsal surface. Specialized median area of T5 reduced relative to non-parasitic species. Pygidial plate not visible in holotype.

*Male.* Unknown.

*Etymology.* The specific epithet means 'thief' in Latin and refers to the species' presumed parasitic lifestyle.

*Type Material.* Holotype label reads (typed): "TANZANIA: Mt. Kilimanjaro, Quadrant 2 Giant Senecio zone, area burnt in 1978, Sheffield U. 6.viii.1993 Meru Galdi"

The type specimen is in fair condition except for three missing legs. The left front leg is broken near the base of the femur and the right mid and hind legs are missing beyond the coxae. The pin was placed through the posterior part of the mesoscutum and exits the left mesepisternum near the ventral side. The mesoscutum and mesepisternum have both split as a result.

*Type Depository.* The holotype is currently deposited in the bee collection (PCYU) at York University, Toronto, Canada.

## DISCUSSION

No behavioural data are available for *L. ereptor* but based on several convergent characters common in parasitic halictines, such as the lack of scopa, weak basitibial plate and reduced penicillus, it seems evident that *L. ereptor* is also a cleptoparasite or social parasite. Although many parasitic halictids have thickened cuticles, coarse sculpture and punctation (e.g. many *Sphec. codes* Latreille and *Temnosoma* Smith), which likely function in defence against hosts (Michener 2007), these characteristics are not present in *L. ereptor* nor in the related parasitic groups of *Dialictus* and *Paradialictus*. This lack of coarse sculpturing may be an indication of recent origin or a mode of parasitism that does not require aggressive encounters. The social parasite *L. (D.) asteris* (Mitchell) is capable of entering guarded nests without combat (Wcislo 1997) but nevertheless has an enlarged head and mandibles that could be used for aggressive encounters. Enlarged mandibles are also seen in *Paradialictus* and other parasitic *Dialictus*. The mandibles of *L. ereptor* are larger than those of related non-parasitic species but smaller than those of North American parasitic *Dialictus*.

*Lasioglossum ereptor* is morphologically similar to the *Afrodialictus* group of the large subgenus *Dialictus* (sensu Michener 2007). The genus-group name *Afrodialictus* refers to tropical African members of *Lasioglossum* s. l. with weak, often tessellate sculpturing, widely spaced punctures, an ecarinate and tessellate propodeum and lacking tomentum on the metasomal terga (Pauly 1999). *Afrodialictus* has been classified as a synonym of *Dialictus* (Michener 2007; but see Pauly et al. 2008) and that classification is followed here. *Lasioglossum ereptor* shares the characteristic traits of *Afrodialictus* but may be differentiated by its suite of parasitic characters.

*Lasioglossum (Paradialictus) synavei* is also believed to be a parasitic derivative of *Afrodialictus* (Pauly 1984; Arduser and Michener 1987). Several characters common in cleptoparasites are shared by *L. ereptor* and *L. synavei*. The unique and highly derived mandibles, the lunate flange of the propodeum, large head and black colouration of *L. synavei* are not shared by *L. ereptor* and suggest separate origins of parasitism in these two species. However, both species are of African origin and their type localities are only separated by approximately 900 km on a nearly east-west axis. *Lasioglossum ereptor* may represent a fourth independent lineage of cleptoparasitism in the genus. It is also probable that North American species of parasitic *Dialictus* are not monophyletic (Michener 1978; Gibbs in prep.). Based on the low-level of differentiation from related nest-building species seen in parasitic *Lasioglossum* relative to other parasitic halictines, the origins of parasitic behaviour are relatively recent (Michener 1978; Arduser and Michener 1987). The existence of multiple and recently derived parasitic lineages make *Lasioglossum* an ideal group for studying the origin of cleptoparasitism. Unfortunately, parasitic *Lasioglossum* are not commonly collected. Additional sampling, behavioural studies and systematic treatment of these bees are needed.

In the past, new generic names have been given to parasitic halictines believed to be derived from non-parasitic hosts. For example, the North American parasitic *Dialictus* were formerly called *Paralictus* but are clearly derived from its host *Dialictus* (Danforth 1999; Danforth et al. 2003). Likewise, the parasitic *Echthralictus* and *Paradialictus* are believed to render their presumed hosts, *Homalictus* and *Afrodialictus*, respectively, paraphyletic. Both the names *Echthralictus* and *Paradialictus* have been maintained to simplify the diagnostic characters of their non-parasitic host taxa (Arduser and Michener 1987; Michener 2007). For *Paradialictus*, at least, this seems hardly necessary because



it is likely derived from *Dialictus s. l.* which includes both parasitic and non-parasitic species. *Lasioglossum ereptor* is classified in the subgenus *Dialictus* to prevent an additional genus-group name in the already complex nomenclature of *Lasioglossum s. l.* that would undoubtedly be later placed into synonymy due to paraphyly of the host taxon. A robust phylogeny of *Lasioglossum* that includes the parasitic taxa is needed to allow for a more stable classification.

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## LITERATURE CITED

- Arduser, M. S. and C. D. Michener. 1987. An African genus of cleptoparasitic halictid bees (Hymenoptera, Halictidae). *Journal of the Kansas Entomological Society* 60: 324–329.
- Biani, N. B. and W. T. Wcislo. 2007. Notes on the reproductive morphology of the parasitic bee *Megalopta byroni* (Hymenoptera: Halictidae), and a tentative new host record. *Journal of the Kansas Entomological Society* 80: 392–394.
- Danforth, B. N. 1999. Phylogeny of the bee genus *Lasioglossum* (Hymenoptera: Halictidae) based on mitochondrial COI sequence data. *Systematic Entomology* 24: 377–393.
- , L. Conway, and S. Q. Ji. 2003. Phylogeny of eusocial *Lasioglossum* reveals multiple losses of eusociality within a primitively eusocial clade of bees (Hymenoptera: Halictidae). *Systematic Biology* 52: 23–36.
- Eickwort, G. C., J. M. Eickwort, J. Gordon, M. A. Eickwort, and W. T. Wcislo. 1996. Solitary behaviour in a high-altitude population of the social sweat bee *Halictus rubicundus* (Hymenoptera: Halictidae). *Behavioral Ecology and Sociobiology* 38: 227–233.
- Engel, M. S. 2001. A monograph of the Baltic amber bees and evolution of the Apoidea (Hymenoptera). *Bulletin of the American Museum of Natural History* 259: 1–192.
- , R. W. Brooks, and D. Yanega. 1997. New genera of augochlorine bees. *Scientific Papers, Natural History Museum, University of Kansas* 5: 1–21.
- Gibbs, J. and L. Packer. 2006. Revision and phylogenetic analysis of *Chilicola sensu stricto* (Hymenoptera: Colletidae) with the description of a new species. *Zootaxa* 1355: 1–37.
- Harris, R. A. 1979. A glossary of surface sculpturing. *Occasional Papers in Entomology* 28: 1–31.
- Michener, C. D. 1974. *The social behavior of the bees*. Harvard University Press, Cambridge, Massachusetts. xii + 404 pp.
- . 1978. The parasitic groups of Halictidae (Hymenoptera, Apoidea). *University of Kansas Science Bulletin* 51: 292–339.
- . 1990. Reproduction and castes in social halictine bees. Pp. 77–121 in: W. Engels ed. *Social insects: an evolutionary approach to castes and reproduction*. Springer-Verlag, New York, vi + 265 pp.
- . 2007. *The bees of the world* [2<sup>nd</sup> edition]. Johns Hopkins University Press, Baltimore, Maryland. xvi + 953 pp.
- Packer, L. 1990. Solitary and eusocial nests in a population of *Augochlorella striata* (Provancher) (Hymenoptera; Halictidae) at the northern edge of its range. *Behavioral Ecology and Sociobiology* 27: 339–344.
- . 1993. Multiple foundress associations in sweat bees (Hymenoptera: Halictidae). Pp. 214–233 in: L. L. Keller ed. *Queen number and sociality in insects*. Oxford University Press, Oxford. xii + 439 pp.
- Pauly, A. 1984. *Paradialictus*, un nouveau genre cleptoparasite récolté au Parc National des Virungas (Zaire) (Hymenoptera, Apoidea, Halictidae). *Revue de Zoologie Africaine* 98: 689–692.
- . 1997. *Paraseladonia*, nouveau genre cleptoparasite afrotropical (Hymenoptera, Apoidea, Halictidae). *Bulletin et Annales de la Société royale belge d'Entomologie* 133: 91–99.
- . 1999. Classification des *Halictini* de la région Afrotropicale (Hymenoptera Apoidea Halictidae). *Bulletin de L'Institut Royal des Sciences Naturelles Belgique, Entomologie* 69: 137–196.
- , K. Timmermann, and M. Kuhlmann. 2008. Description of a new interesting species from South Africa, *Evyaleus (Sellalictus) fynbosensis* n.sp. (Hymenoptera Apoidea Halictidae). *Journal of Afrotropical Zoology* 4: 85–91.
- Wcislo, W. T. 1997. Invasion of nests of *Lasioglossum imitatum* by a social parasite, *Paralictus asteris* (Hymenoptera: Halictidae). *Ethology* 103: 1–11.
- Yanega, D. 1997. Demography and sociality in halictine bees (Hymenoptera: Halictidae). Pp. 293–315 in: B. J. Crespi, and J. C. Choe eds. *The evolution of social behavior in insects and arachnids*. Cambridge University Press, Cambridge, Massachusetts. xiii + 541 pp.